

CLAIMS

1. An ATM communication system connected to a plurality of information apparatuses in a private area and adapted to transmit an ATM cell between the  
5 plurality of information apparatuses, comprising:

a plurality of connection ports respectively connected to said plurality of information apparatuses and adapted to receive/output ATM cells from/to said respective information apparatuses;

10 port tag adding means for adding port tags for identifying said respective connection ports to the respective ATM cells received therefrom;

cell flow generating means for generating two cell flows in first and second directions from the ATM cells  
15 to which the port tags are added by said port tag adding means; and

cell drop means for extracting ATM cells from the cell flow generated by said generating means and flowing in the second direction on the basis of the  
20 port tags added to the ATM cells by said port tag adding means, and dropping the extracted ATM cells to said plurality of connection ports.

2. A system according to claim 1, further comprising cell counting means for counting the number  
25 of cells in one of the two cell flows generated by said cell flow generating means, and

wherein said cell flow generating means includes

network synchronization means for inserting the ATM cell to which the port tag is added and an empty cell into the cell flows in the first and second directions in synchronism with a cell slot period estimated on the basis of the number of cells counted by said cell counting means.

3. An ATM communication system for transmitting an ATM cell between a plurality of information apparatuses in a private area and a plurality of communication units respectively connected to said information apparatuses,

each of said communication units comprising:  
a first communication unit connection port connected to a first communication unit as another of said communication units and adapted to receive a first cell flow from said first communication unit and output a second cell flow, which flows in a direction opposite to the first cell flow, to said first communication unit;

a second communication unit connection port connected to a second communication unit as still another of said communication units and adapted to receive the second cell flow from said second communication unit and output the first cell flow to said second communication unit;

a plurality of information apparatus connection ports respectively connected to said plurality of

information apparatuses and adapted to receive/output ATM cells from/to said respective information apparatuses;

5 port tag adding means for adding port tags for identifying said respective information apparatus connection ports to the respective ATM cells received therefrom;

10 cell counting means for counting the number of cells in the first cell flow received from said first communication unit connection port;

cell inserting means for inserting the ATM cell to which the port tag is added by said port tag adding means and an empty cell in the first and second cell flows in synchronism with a cell slot period estimated on the basis of the number of cells counted by said cell counting means; and

15 cell drop means for extracting ATM cells from the first and second cell flows on the basis of the port tags added to the ATM cells, and dropping the extracted ATM cells to said plurality of connection ports.

4. A system according to claim 3, wherein each of said communication units comprises:

25 power receiving means for receiving power supplied from said first communication unit connected to said first communication unit connection port; and

power distributing means for distributing the power received by said power receiving means to said

respective information apparatuses connected to said information apparatus connection ports and said second communication unit connected to said second communication unit connection port.

5           5. An ATM communication system connected to a plurality of information apparatuses in a private area and adapted to transmit an ATM cell between said plurality of information apparatuses, comprising:

10           an ATM cell transmission/reception unit for generating a first cell flow;

            second cell flow generating means for generating a second cell flow, which flows in a direction opposite to the first cell flow, on the basis of the first cell flow generated by said ATM cell transmission/reception unit;

15

            a plurality of connection ports respectively connected to said plurality of information apparatuses and adapted to receive/output ATM cells from/to said respective information apparatuses;

20           port tag adding means for adding port tags for identifying said respective connection ports to the respective ATM cells received therefrom;

            cell inserting means for inserting ATM cells to which port tags are added by said port tag adding means into the first and second cell flows;

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            cell drop means for extracting ATM cells from the first and second cell flows on the basis of the port

tags added to the ATM cells by said port tag adding means, and dropping the extracted ATM cells to said plurality of connection ports; and

5 cell flow output means for outputting the second cell flow in which the ATM cell is inserted by said cell inserting means to said ATM cell transmission/reception unit.

10 6. A system according to claim 5, wherein said ATM cell transmission/reception unit comprises first cell flow generating means for generating a first cell flow by inserting ATM cells into cell slots generated on the basis of a predetermined band.

15 7. A system according to claim 5, further comprising cell counting means for counting the number of cells in the first cell flow generated by said ATM cell transmission/reception unit, and

20 wherein said cell inserting means comprises network synchronization means for inserting the ATM cell to which the port tag is added and an empty cell into the first and second cell flows in synchronism with a cell slot period estimated on the basis of the number of cells counted by said cell counting means.

25 8. An ATM communication system comprising a plurality of buses for connecting at least one first device for transmitting/receiving an ATM cell and a plurality of second devices, and at least one bridge circuit for hierarchically connecting said plurality of

buses,

all said first devices being connected to one of said plurality of buses, and

said first device including:

5 message generating means for generating an ATM cell transmission message by inserting an ATM cell to be transmitted to one of said devices connected to said plurality of buses into a message in a format depending on said bus;

10 address output means for outputting an address for designating a device as a destination of the ATM cell transmission message generated by said message generating means, by using a bus identifier for identifying one of said plurality of buses and a device identifier  
15 for identifying one of said plurality of devices; and

message transmission means for writing the ATM cell transmission message in said device designated by the address output from said address output means.

9. An ATM communication system comprising a  
20 plurality of buses for connecting at least one first device for transmitting/receiving an ATM cell and a plurality of second devices, at least one bridge circuit for hierarchically connecting said plurality of buses, and an arbiter,

25 all said first devices and said arbiter being connected to one of said plurality of buses,

said first device comprising:

message generating means for generating an ATM cell transmission message by inserting an ATM cell to be transmitted to one of said plurality of devices connected to said plurality of buses into a message in a format depending on said bus;

bus request means for outputting, to said arbiter, a bus request signal for requesting authorization to use said bus so as to output the ATM cell transmission message generated by said message generating means;

address output means for, when authorization to use said bus is given by said arbiter which has received the bus request signal, outputting an address for designating a device as a destination of the ATM cell transmission message generated by said message generating means, by using a bus identifier for identifying one of said plurality of buses and a device identifier for identifying one of said plurality of devices; and

message transmission means for writing the ATM cell transmission message in said device designated by the address output from said address output means, and

said arbiter comprising bus authorizing means for, when receiving bus request signals from said first device and said bridge circuit, giving authorization to use said bus to said first device in preference to said bridge circuit.

10. A system according to claim 9, wherein said

arbiter comprises band assigning means for, when  
receiving a bus request signal output from said first  
device, giving authorization to use said bus to said  
first device on the basis of an ATM cell transmission  
5 interval calculated on the basis of a band assigned to  
said first device in advance.

11. A system according to claim 9, wherein said  
arbiter comprises band assigning means for, when  
receiving a bus request signal output from said first  
10 device, giving authorization to use said bus to said  
first device in accordance with an ATM cell transmis-  
sion time based on an ATM cell transmission interval  
calculated on the basis of a band assigned to said  
first device in advance.

12. A system according to claim 8, wherein said  
15 plurality of buses include a PCI bus.

13. A system according to claim 9, wherein said  
plurality of buses include a PCI bus.

14. A system according to claim 5, wherein said  
20 ATM cell transmission/reception unit comprises a  
plurality of buses connected to at least one first  
device for transmitting/receiving an ATM cell and a  
plurality of second devices, and at least one bridge  
circuit for hierarchically connecting said plurality of  
25 buses,

all said first devices being connected to one of  
said plurality of buses,



said first device comprises:

message generating means for generating an ATM  
cell transmission message by inserting an ATM cell to  
be transmitted to one of said devices connected to said  
5 plurality of buses into a message in a format depending  
on said bus;

address output means for outputting an address for  
designating a device as a destination of the ATM cell  
transmission message generated by said message generat-  
10 ing means, by using a bus identifier for identifying  
one of said plurality of buses and a device identifier  
for identifying one of said plurality of devices  
connected to said buses; and

message transmission means for writing the ATM  
15 cell transmission message in said device designated by  
the address output from said address output means, and

at least one of said plurality of first devices  
comprises a cell flow output/input port for outputting/  
inputting the first and second cell flows.

20 15. A system according to claim 5, wherein said  
ATM cell transmission/reception unit comprises a  
plurality of buses connected to at least one first  
device for transmitting/receiving an ATM cell and a  
plurality of second devices, at least one bridge  
25 circuit for hierarchically connecting said plurality of  
buses, and an arbiter,

all said first devices and said arbiter being

connected to one of said plurality of buses,

said first device comprises:

message generating means for generating an ATM  
cell transmission message by inserting an ATM cell to  
5 be transmitted to one of said plurality of devices  
connected to said plurality of buses into a message in  
a format depending on said bus;

10 bus request means for outputting, to said arbiter,  
a bus request signal for requesting authorization to  
use said bus so as to output the ATM cell transmission  
message generated by said message generating means;

15 address output means for, when authorization to  
use said bus is given by said arbiter which has  
received the bus request signal, outputting an address  
for designating a device as a destination of the ATM  
cell transmission message generated by said message  
generating means, by using a bus identifier for  
identifying one of said plurality of buses and a device  
identifier for identifying one of said plurality of  
20 devices connected to said buses; and

message transmission means for writing the ATM  
cell transmission message in said device designated by  
the address output from said address output means,

25 said arbiter comprises bus authorizing means for,  
when receiving bus request signals from said first  
device and said bridge circuit, giving authorization to  
use said bus to said first device in preference to said

bridge circuit, and

at least one of said plurality of first devices comprises a cell flow output/input port for outputting/ inputting the first and second cell flows.

5           16. A system according to claim 14, wherein said plurality of buses include a PCI bus.

17. A system according to claim 15, wherein said plurality of buses include a PCI bus.

10           18. An ATM communication method used for a plurality of information apparatuses in a private area to transmit an ATM cell between said plurality of information apparatuses, comprising:

15           the index information acquiring step of acquiring index information associated with processes which can be executed by said information apparatuses, and with information data held in said information apparatuses, which are stored in each of said plurality of information apparatuses;

20           the index information presenting step of presenting the index information acquired in the index information acquiring step; and

25           the ATM cell transmission step of, when given information data and a given process are linked together on the basis of the index information presented in the index information presenting step, transmitting the information data using an ATM cell to the information apparatus which executes the process

linked with the information data.

19. An ATM communication method used for a plurality of information apparatuses in a private area to transmit an ATM cell between said plurality of information apparatuses, comprising:

5 the index information acquiring step of acquiring index information associated with processes which and can be executed by the information apparatuses, and with information data held in said information apparatuses, which are stored in each of said plurality  
10 of information apparatuses;

the index information presenting step of presenting the index information acquired in the index information acquiring step;

15 the connection setting step of, when given information data and a given process are linked together on the basis of the index information presented in the index information presenting step, setting connection between the information apparatus  
20 holding the information data and the information apparatus which executes the process linked with the information data; and

the ATM cell transmission step of using the connection set in the connection setting step to  
25 transmit the information data using an ATM cell to said information apparatus which executes the process linked with the information data.

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